

of the target ~~molecule~~ protein to form a first covalent bond such that the ligand in the target protein-ligand conjugate contains a free chemically reactive group, in aqueous solution, under conditions wherein at least one member of the library forms a second covalent bond with the target protein-ligand conjugate, and

(b) ~~identifying~~ determining the identity of a small organic compound that binds covalently to the chemically reactive group of the target protein-ligand conjugate.

41. (Previously added) The process of Claim 40 wherein the second covalent bond is a disulfide bond.

42. (Canceled)

43. (Canceled)

44. (Previously added) The process of Claim 40 wherein the free chemically reactive group is a thiol.

45. (Previously added) The process of Claim 40 wherein each member of the library of small organic compounds comprises thiols or disulfides.

46. (Previously added) The process of Claim 45 wherein each member of the library further contains a group selected from amides, secondary amides, disulfides and carbamates.

47. (Previously added) The process of Claim 40 wherein the identifying step comprises using mass spectrometry.

48. (Previously added) The process of Claim 47 wherein mass spectrometry is used to measure the mass of complex formed by the small organic compound covalently bound to the target protein-ligand conjugate.

49. (Previously added) The process of Claim 48 wherein the complex is first fragmented prior to subjecting it to mass spectrometry.

50. (Previously amended) The process of Claim 49 comprising liberating or releasing the small organic compound from the complex prior to subjecting the small organic molecule to mass spectrometry.

51. (Previously added) The process of Claim 50 wherein the liberating step comprises treating the conjugate with an agent that disrupts the disulfide bond through

which the small organic compound forms a complex with the target protein-ligand conjugate.

52. (Previously amended) The process of Claim 51 wherein the agent is selected from borohydride or a phosphine.

53. (Previously added) The process of Claim 51 further comprising coupling the liberated small organic compound to a labeled probe that facilitates identification of the compound by mass spectrometry.

54. (Canceled)

55. (Canceled)

56. (Previously amended) The process of Claim 40 wherein the target protein is selected from enzymes, proteases, kinases, phosphatases (dephosphorylases), cytokine receptors, hormones, interleukins, tyrosine kinase receptors, TNF, mdm2, chemokines and their receptors, signal transduction molecules and transcription factors.

57-62. (Canceled)

63. (Previously added) The process of Claim 52 wherein said agent is tris-(2-carboxyethyl)-phosphine (TECP).

64. (New) The process of claim 40 wherein the first reactive functionality is an -SH group, masked -SH group, or activated -SH group.

65. (New) The process of claim 64 wherein said -SH group, masked -SH group, or activated -SH group is associated with a cysteine residue of said target protein.

66. (New) A process comprising

(a) screening a library of small organic compounds less than about 2000 daltons in size, with a target protein-ligand conjugate formed by the covalent bonding of a target protein comprising a cysteine residue with a ligand that (1) comprises less than about 20 carbon atoms; (2) has affinity for interacting with a particular site on the target protein; (3) comprises a reactive functionality and (4) comprises a chemically reactive group, wherein the reactive functionality of the ligand reacts with the cysteine residue of the target protein to form a covalent bond such that the ligand in the target protein-ligand conjugate contains a free -SH group, activated -SH group or protected -SH group, in

aqueous solution, under conditions wherein at least one member of the library forms a disulfide bond with the target protein ligand conjugate, and

(b) determining the identity of a small organic compound that binds covalently to the chemically reactive group of the target protein-ligand conjugate.

67. (New) The process of claim 66 wherein said disulfide bond is formed under reducing conditions.

68. (New) The process of claim 67 wherein said disulfide bond is formed in the presence of a reducing agent.